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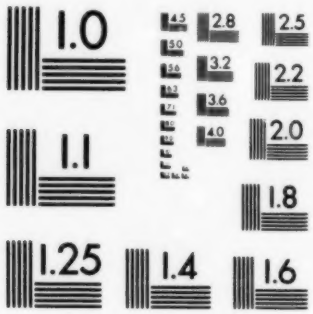

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS
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NATIONAL MICROGRAPHICS ASSOCIATION

24x

FRDA Research Memo

November 1988 Seed and Stock Quality No. 059

Nursery Trials of Sitka-Interior Spruce Hybrids

THE PROBLEM

Sitka spruce and the interior spruces (white and Engelmann) appear to interbreed in areas where major river drainages bisect the coast mountains. This is thought to be most common in the Skeena, Nass and Bulkley River areas. Spruce is often preferred for reforestation in these areas, and operational seed collection and nursery production programs are in place to supply the needed stock.

Incorrect species classification is a problem for container nurseries attempting to produce seedlings that meet specific standards of size and quality. The primary difficulty occurs when a seedlot incorrectly identified as white or Engelmann spruce is grown with supplemental light. The extended photoperiod causes the seedlings (which are actually Sitka spruce or a Sitka hybrid) to grow well beyond target size. Similarly, interior spruce grown under a Sitka spruce regime (no extended photoperiod) will tend to set bud early and the seedlings may not reach target size.

OBJECTIVE

This project was initiated to determine the species and preferred growing regime for 61 British Columbia Forest Service seedlots, and to outline the approximate zone of Sitka by interior spruce hybridization.

METHOD

The 61 seedlots were sown in PSB 313 containers in two groups at the Canadian Pacific Forest Products Ltd. Saanich Nursery. One group was grown under an interior spruce regime (with extended photoperiod), and the other group under a Sitka spruce regime with no supplemental light.

The following data were collected for each group: height, caliper, budset date, root dry-weight, and shoot dry-weight.

RESULTS

Analyses of the data allowed seedlots to be clustered into three groups representing Sitka spruce, interior spruce, and a Sitka-interior hybrid (Figure 1). The area in which hybridization appeared to be most common has been outlined in Figure 2. This area encompasses the Skeena, Bulkley, and Nass River drainages between Terrace and Smithers. Less evidence of hybridization was found in the mid-coast area and in Knight Inlet, however, these areas were less intensively sampled.

RECOMMENDATION

Based on the species delineation indicated in Figure 1, seedlots collected west of the boundary between interior and hybrid spruce should be grown under a Sitka spruce regime (see Figure 2). Seedlots from the mid coast and Knight Inlet areas should also be grown under a Sitka spruce regime. Seedlots collected east and north of this boundary should be grown as interior spruce. It must be stressed, however, that these boundaries are based on limited data, and the actual hybridization zone is likely a gradient between the species, with numerous intrusions of the pure or nearly pure type.

FUTURE WORK

Management of the spruces within the hybridization zone may be a complex problem. Hybrid seed likely contains a species gradient from pure Sitka spruce to pure interior spruce, with the highest proportion represented by a nearly intermediate hybrid. If seedlings from a hybrid lot are planted near the eastern edge of the hybrid zone, a proportion of the seedlings that are close to the Sitka end of the species gradient may die

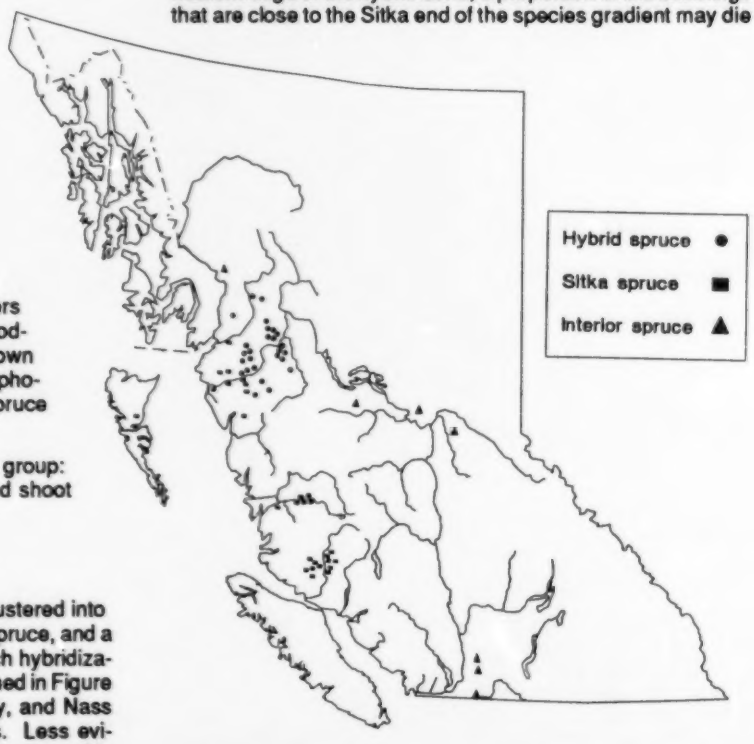

FIGURE 1. Seedlot locations and estimated species.

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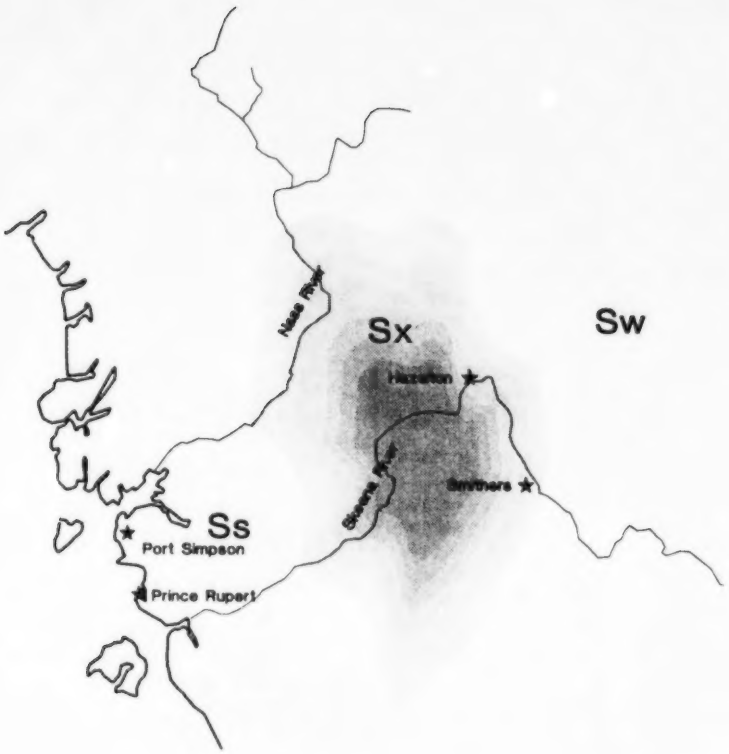

FIGURE 2. Estimated zone of Sitka by interior spruce hybridization in the Nass, Skeena and Bulkley river areas. Boundaries are approximate, and may change as further information is available. Note: Banding to darker areas represents increasing possibility of hybridization.

because of frost, decreasing plantation survival over and above the losses that occur due to other factors. The same seedlot planted near the western edge of the hybrid zone may result in a loss of productivity, as a proportion of the stand contains the slower growing interior spruce.

At the more extreme ends of the hybridization zone, local seed sources may not be best if they contain a hybrid component. In these locations it may be best to introduce pure Sitka or pure interior spruce to prevent losses due to frost, or an inability to compete in the existing stands.

In the more central parts of the hybridization zone the hybrids may be more desirable than either pure Sitka or interior spruce, especially if they have incorporated some of the frost hardiness of interior spruce and the fast growth of Sitka. However, even in these areas, the seed collected from a hybrid stand will contain a species gradient from pure Sitka to pure interior.

Thorough investigation of hybridization to determine optimum seed sources for various ecological types within the zone will require long-term trials, testing a variety of specific crosses and wild stand collections.

Seedlings from the seedlots used in this study have been outplanted on two sites at opposite ends of the hybridization zone in the Skeena River Area. Growth and survival data from these trees will be used to further delineate the hybridization zone, and will provide background for the design of studies aimed at improving the management of hybrid spruce.

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